Abstract

An apparatus and methods for softening water is disclosed. In particular, an apparatus and method for softening water without the addition of ions the wastewater stream is disclosed. The apparatus generally includes at least one nanofiltration filter

5   element configured and arranged to receive an input flow of hard water, discharge an output flow of permeate water comprising a portion of the input flow, and discharge an output flow of non-permeate water comprising a portion of the input flow. The nanofiltration filter element typically has an average pore size that permits the passage of water and monovalent ions but substantially prevents the passage of divalent ions.